

### Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application.

### Listing of Claims:

1-64. (Cancelled)

65. (Currently amended) The Josephson junction device of claim 59A  
Josephson junction device, comprising:

a first layer comprising an oxide high-temperature superconductor;

a second layer comprising an oxide high-temperature superconductor; and

a third layer connecting the first and second layers and comprising a non-superconductor,

the first and third layers being formed from a starting oxide high-temperature superconductor layer of an oxide high-temperature superconductor, the third layer being an ion-modified portion of the starting oxide high-temperature superconductor layer, the first layer being an unmodified portion of the starting oxide high-temperature superconductor layer,

the device having an  $R_nA$  value of about  $1 \times 10^{-9}$  to about  $3 \times 10^{-7} \Omega \cdot \text{cm}^2$  at 4.2K.

66. (Currently amended) The Josephson junction device of claim 65[2],  
wherein the first layer comprises an YBCO superconducting oxide having an  $R_nA$  value of about  $1 \times 10^{-9}$  to about  $3 \times 10^{-7} \Omega \cdot \text{cm}^2$  at 4.2K.

67. (Currently amended) *The device of claim 1* An electronic device comprising:

a crystalline substrate;

an electrode formed on and epitaxial to the substrate, the electrode comprising a first superconductive oxide;

a barrier comprising a non-superconducting, ion-modified surface layer of the first superconductive oxide; and

a counter-electrode formed directly on and epitaxial to the barrier, the counter-electrode comprising a second superconductive oxide, whereby a Josephson junction is formed between the electrode and the counter-electrode, having an  $R_n A$  value of about  $1 \times 10^{-9}$  to about  $3 \times 10^{-7} \Omega \cdot \text{cm}^2$  at 4.2 K.

68. **(Currently amended)** The device of claim 67, wherein the first and second superconductive oxides are YBCO having an  $R_n A$  value of about  $1 \times 10^{-9}$  to about  $3 \times 10^{-7} \Omega \cdot \text{cm}^2$  at 4.2 K.

69. **(Cancelled)**

70. **(Cancelled)**

71. **(Currently amended)** The Josephson junction device of claim 59 A Josephson junction device, comprising:

a first layer comprising an oxide high-temperature superconductor;

a second layer comprising an oxide high-temperature superconductor; and

a third layer connecting the first and second layers and comprising a non-superconductor,

the first and third layers being formed from a starting oxide high-temperature superconductor layer of an oxide high-temperature superconductor, the third layer being an ion-modified portion of the starting oxide high-temperature superconductor layer, the first layer being an unmodified portion of the starting oxide high-temperature superconductor layer,

the device having a  $J_c$  value of about  $1 \times 10^3$  to about  $5 \times 10^6 \text{ A/cm}^2$  at 4.2 K.

72. **(Currently amended)** The Josephson junction device of claim 71 62 wherein the first layer comprises an YBCO superconducting oxide, having a  $J_c$  value of about  $1 \times 10^3$  to about  $5 \times 10^6 \text{ A/cm}^2$  at 4.2 K.

73. **(Currently amended)** The Josephson junction device of claim 1, an electronic device comprising:  
a crystalline substrate;  
an electrode formed on and epitaxial to the substrate, the electrode comprising a first superconductive oxide;  
a barrier comprising a non-superconducting, ion-modified surface layer of the first superconductive oxide; and  
a counter-electrode formed directly on and epitaxial to the barrier, the counter-electrode comprising a second superconductive oxide, whereby a Josephson junction is formed between the electrode and the counter-electrode,  
the device having a  $J_c$  value of about  $1 \times 10^3$  to about  $5 \times 10^6$  A/cm<sup>2</sup> at 4.2 K.

74. **(Currently amended)** The Josephson junction device of claim 73[7], wherein the first and second superconductive oxides are YBCO having a  $J_c$  value of about  $1 \times 10^3$  to about  $5 \times 10^6$  A/cm<sup>2</sup> at 4.2 K.

75. **(New)** The Josephson junction device of claim 65, wherein the third layer is substantially uniform.